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An Analysis of the Business Structures and Performance of Traditional vs. "Freemium" Applications

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Honors Thesis

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Abstract

This thesis will examine the rationale and financial success of “freemium” applications versus traditional applications. I define what the “freemium” model is, and how it compares to the traditional (premium) and “free trial” models. In addition, I discuss the value proposition of the business structure, and how it is fully dependent on the consumer’s ability to perceive an increase in value through the purchase of additional features. I also analyze the major positive and negative aspects of the “freemium structure.

Overall trends that I note in the paper include a general shift towards “freemium” and “subscription” based products; within the game subsegment, specifically, we see corporations succeeding with the “freemium” model. In addition, one emerging trend prevalent as of recent times is companies failing to offer a value proposition that is satisfying enough to its consumers.

This thesis also includes several financial analyses; notably, why the popular “freemium” battle royale game Fortnite outperforms its paid competitor PlayerUnknown's Battlegrounds (PUBG). In addition, I evaluate companies which have had successful or unsuccessful experiences with the “freemium” model, whether from switching models or initially adopting it. MailChimp switched to a “freemium” model and found its paying customer base grow significantly, whereas Ning struggled with implementing the “freemium” model and adopted a traditional model. Some metrics I analyze include changes in the composition and raw amount of revenue and customer base, as well as the reasons why the “freemium” model proved to be successful or not for a business. Ultimately, if implemented correctly, the “freemium” business model might just be the disruption a company needs to revitalize its performance.

Introduction

The best value proposition for an individual is the one that comes at no cost, the one that is free. Whether you are sampling a new appetizer at your local wholesale club or reading today's version of your college newspaper, you are more willing and compelled to engage in goods or services that requires no payment. This is the case because as there is no risk to individuals who may not gain anything from it. Nevertheless, someone who finds such an offer beneficial will most likely continue to engage in the service, and may even attract others to join.

Due to the advent of our digital society, companies seek to develop various software applications intended to provide services to consumers. These offerings usually come in the form of a "freemium" model, where the base product -usually available for free, but with limited capabilities- is made available in the market. Once individuals have the initial product, they may choose to purchase additional features that may enhance the product. This is intended to compete with traditional applications, where individuals pay a certain amount outright to gain access to the application. Many younger, newer companies choose the "freemium" model over others. This is because it is an effective way to quickly build a consistent consumer base. As important as having large market is for a company's success, it must also be able to generate revenue and produce a profit.

"Freemium" companies are left with a dual mandate to "[grow] the consumer base by offering a free service and maintaining premium services to incentivize upgrades in order to stay profitable" (Lee, 2013). On both ends, companies strive to innovate new features to retain and grow its premium customer base. They must constantly develop new free services to lure new users to try the product. Ultimately, the real question raised is how a product that is available for free to users just as successful, if not more so, than its traditional equivalent. The "freemium" design for applications is a unique model which offers distinct advantages which give it a competitive edge over its counterpart, the traditional structure.

Defining the "Freemium" Business Structure

The term "freemium" was famously coined in 2006 by venture capitalist Fred Wilson. He explained this model as the following:

> "Give your service away for free, possibly ad supported but maybe not, acquire a lot of customers very efficiently through word of mouth, referral networks, organic search marketing, etc., then offer premium priced value added services or an enhanced version of your service to your customer base" (Gailly, 2016).

A 'freemium' application is defined as a product which is available for users at no cost, which also offers additional features which users may purchase, typically through "in-app" transactions. "Freemium" applications counterpart, also known as a "premium" application, is one which users must pay for. Typically, both types of structure are most frequently used by software companies, especially in the genre of games. Examples of the "freemium" structure are prevalent in many applications we use today; popular software such as Skype and Dropbox are among the earliest successful implementations of this feature. More recently, however, the prevalence of "freemium" applications is most emergent within online gaming, such as is the case with the popular battle royale title Fortnite, and in mobile games like Clash Royale, among other Hubs of entertainment. Some benefits of the "freemium" model include its networking abilities between users, which correlates with its scalability to grow. A drawback to the "freemium" model is that customer acquisition costs run high compared to other structures, and run the risk of failing to monetize the application if free users do not make any purchases.

The primary goal of the "freemium" model is to attract users. Companies want users to try the basic, free version of their product, and entice them to purchase advanced features of the product. Both the free version and premium models serve specific functions; with the “freemium” model, the basic model is intended to grow the customer base for that respective product as effectively as possible. The premium features are what generate the revenue for the product. Pascal-Emmanuel Gobry, a columnist for Business Insider, explains, “plenty of software...have some sort of free option, but the goal is to have the majority of users pay.” He exemplifies this through the analogy, “a restaurant that offers free appetizers is not a freemium business” (Gobry, 2011). Without users upgrading to premium content, a company cannot generate revenue from the free option alone.

Typically, the “freemium model” is applied in software applications, predominantly within the gaming subsegment; regardless, a large variety of genres utilize this scheme. Popular applications such as Dropbox and Skype were among the first large services to implement the “freemium” business model. Since then, many companies have adapted the “freemium” model and have incorporated it into their products; Spotify offers a free and premium plan for its streaming service, Apple for its iCloud storage, online newspapers such as *The Wall Street Journal* and *The New York Times* for article access.

It is important to contrast the “freemium” model against both the traditional model and “free-trial” model. The traditional model, commonly referred to as the premium model, is the structure where an individual purchases a good or service outright. This model is the most direct method for a company to generate revenue from a customer. Moreover, individuals may still have the opportunity to spend additional money for additional features after purchasing of the application. Any application available in phone’s app store that requires payment would be an example of this. Compared to “freemium” structure, this bears more risk on consumers as all users must first incur some cost in order to gain access to the respective goods or services. In this case, if an individual is unsatisfied, then they would have lost an amount equivalent to the cost of access, usually around $1.00, the cost of most mobile applications.

Just as the name implies, the “free trial” model is designed to give users the opportunity to try the full version of a good for a temporary amount of time. A very common example of this would be Netflix’s free trial for its video streaming service; users can submit their email to get a trial version of the service for one month. Once the thirty days have passed, access to the service is terminated. Professor and leading academic on “freemium” models, Vineet Kumar, who I had the chance to contact, argues that the “freemium” model is superior to types of trial offers. He states, “freemium is more successful than 30-day free trials or other limited-term offers because customers have become wary of cumbersome cancellation processes and find indefinite free access more compelling” (Kumar, 2015). What we see is that, as a whole, the “freemium” business structure offers the best value proposition, but can be difficult to execute effectively.

The Value Proposition of "Freemium"

The basis for how companies generate revenue from the "freemium" model is dependent on the consumer's perceived value. Consider the following image which depicts the "freemium" model (Freemium, 2019):

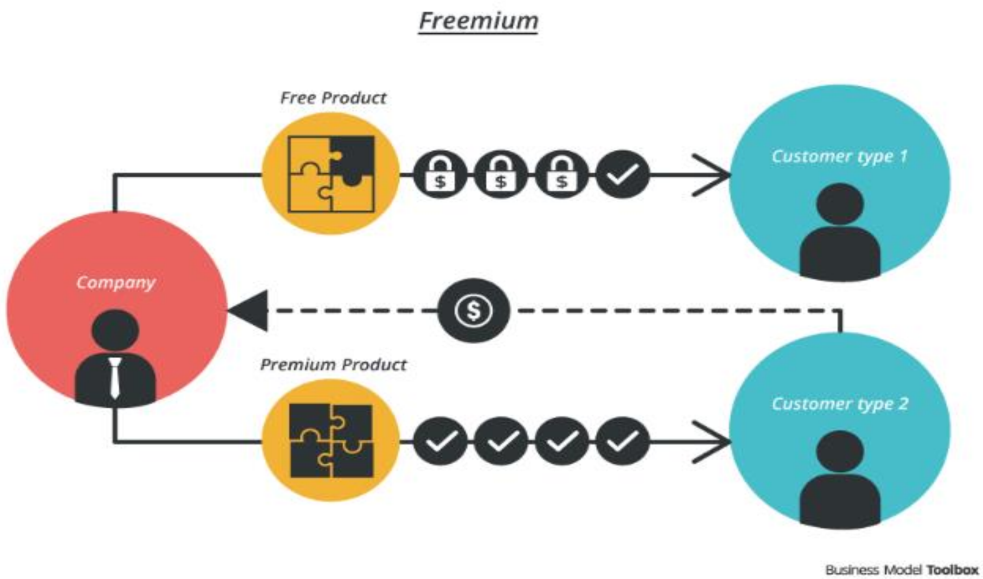

Figure 1: Display of how the "Freemium" model generates money for a company

Customers must be able to differentiate the quality and value of a company's free and premium products. Without making the two products clearly distinct, companies will fail to convert any free users into paying customers. If companies are failing to gain users, there just might be a mismatch between how the consumer values the product compared to its intended benefit. This will result in the company only acquiring Type 1 customers (as shown in the visual above)

Kumar states that if a free product is unsuccessful in garnishing user traffic and overall usage, "your free offerings are not compelling enough and you need to provide more or better features free." Ironically, companies may have the opposite problem, which he describes as the event where a product, "[generates] lots of traffic but few people are paying to upgrade." If this case, he believes that "your free offerings are too rich, and it's time to cut back" (Kumar, 2015). In all, mastering the art of "freemium" is truly a balancing act; companies need to develop a free product that can successfully captivate users, but also offer a premium product that has noticeable benefits over its free equivalent.

One such company who has had success in doing this is Evernote. Evernote is a note-taking application which allows its users to scan notes and articles, and automatically converts them into interactive files which can be edited and shared with others through the cloud. According to CEO Phil Libin, his company's success is fully attributed to the "freemium" model. Evernote offers users free unlimited access to its service, but only with a limited amount of storage without any offline capabilities. Its paid version, pricing in at $5 for one month or $45 for one year, "offers perks such as added storage space and offline access" (Macsai, 2012). Furthermore, the company continues to broaden the capabilities of both its offerings, in order to attract new users, and prompt free users to purchase the paid version. The company unveils intermittently, "features that save users time or make their stored information safer; some updates are free, while others are available only to paid users, such as the ability to revert to previous versions of notes" (Macsai, 2012). From the customer's perspective, the gain in value from Evernote's free product to paid version is very apparent; this is very evident in the company's ability to convert users, as depicted in the following graph (Macsai, 2012):

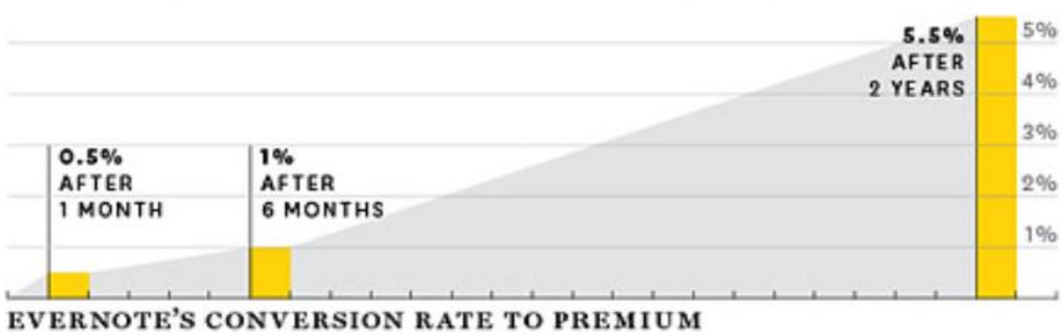

Figure 2: Conversation rate of Evernote's customer base to premium products over the course of two years

According to Libin’s estimations, Evernote only needs to maintain a conversion rate of 1% to generate a profit. However, “roughly 2% of all Evernoters are premium customers, which is good for business” (Macsai, 2012). This also couples with the fact that the company is operating with an efficiency that enables them to maintain low costs. Consider the following breakdown (Macsai, 2012):

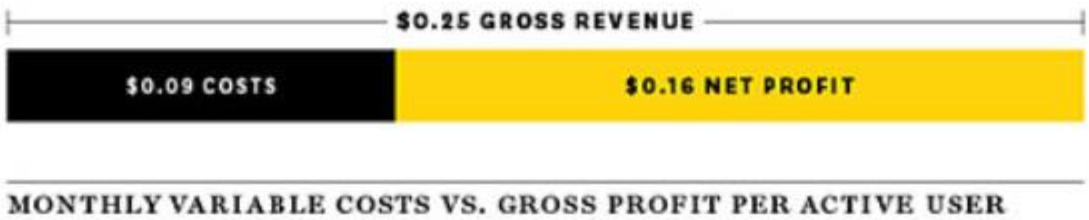

Figure 3: Breakdown of Evernote’s revenue and costs

Evernote’s costs of goods sold are only 36% of the total revenue it generates from each active user. This means that the company is able to maintain a sizable amount, 64%, in unit revenue. As shown in Figure 3, the company’s profit model is seemingly linear; the company estimates its total profit to grow in line with the rate at which it grows its user base. Despite its financial success, Libin is hesitant to assume the perpetual success of the “freemium” model. He questions, “If people start converting en masse, “that means our free product isn’t good enough,” and “if our free product isn’t good enough, what’s the point of being freemium” (Macsai, 2012). For most companies using a “freemium” structure, their sustainability is dependent on the efforts to consistently develop new features for its offerings to drive growth in its customer base. As effective as the business structure is for Evernote, the “freemium” model still has certain advantages and disadvantages that may impact a company’s success.

Strengths and Weaknesses of the "Freemium" Structure

Strengths:

One of the most apparent benefits of the "freemium" model is the ability to grow an application's user base. This stems from the fact that users risk nothing by trying or testing a "freemium" product. Presumably, one may think that the company only benefits from premium users, those paying money and contributing to the financial success of the company. However, even customers who do not pay a single cent serve a purpose since they are sources of "potential revenue," as described best by Ava Seave. Through methods such as word-of-mouth sharing, and promoting the service on social media, the potential upside remains limitless. Word-of-mouth marketing may result in "other consumers who may become premium users;" similarly, social media promotion can "[raise] the probability that the sharing consumers will convert to paid premium consumers" (Seave, "For "Freemium" Companies, What Are Non-Paying Consumers' Real Value?", 2014). Imagine the following scenario: if an application has an arbitrary user who will never pay for an additional service, that individual may still end up convincing five additional people to try the app; of those five, one may become a paying consumer. So as a result of one adamant non-paying customer, that application still gained new users, including one who will make a purchase.

Overtime, the accumulation of users can prove to be very beneficial for a company, as was the case for Evernote. Consider the following graph (Macsai, 2012):

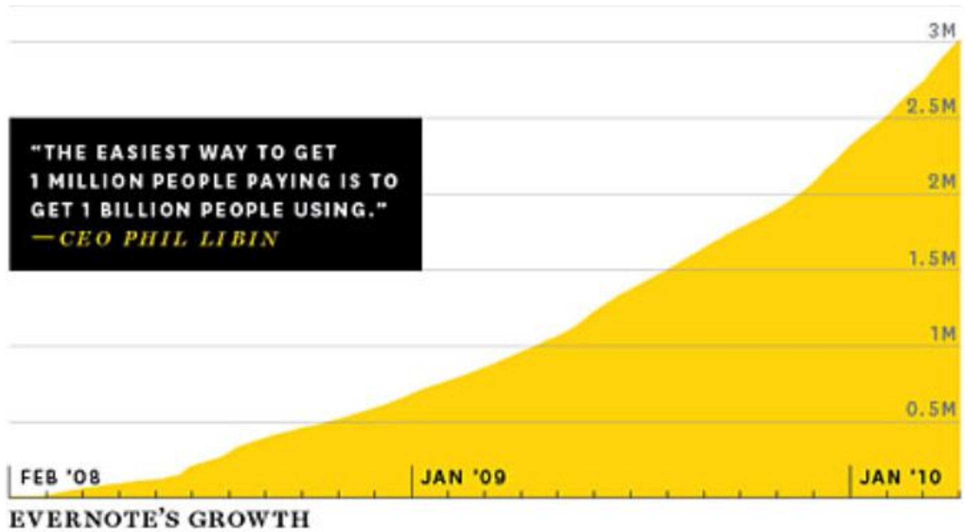

Figure 4: Evernote's growth in customer base from 2008 to 2010

At Evernote's inception, during the early stages of beta testing, it began with roughly 50,000 participants. Nearly two years later, its customer base reaches 3 million unique individuals, an astounding 60,000% growth from its start. Most significantly though, Evernote's grew despite not engaging in any expensive marketing campaigns, or even maintaining a sales team. What we see is that the "freemium" approach "[is] more sustainable source of revenue than the advertising model prevalent among online firms in the early 2000's" (Kumar, 2015). The "freemium" model offers many benefits which may makes its structure a good fit for certain companies.

<u>Weaknesses</u>

One of the biggest flaws of the "freemium" method is its high acquisition costs for new users. Considering the different types of user's actions, the "freemium" strategy may not be the most effective method to capture and retain new customers. Even considering other criteria, such as the brand of device might have an effect on acquisition costs. Consider the following visual, taken from the 2018 Mobile App Engagement Index (2018):

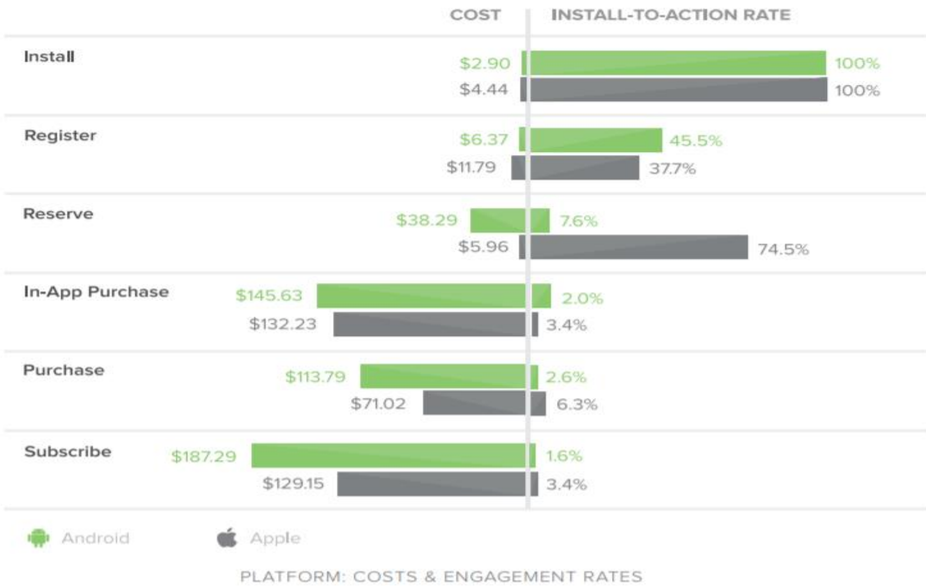

Figure 5: Acquisition cost and engagement rates of each application pricing model

Regardless of the device platform, we can see that in-app purchases have a high acquisition cost compared to actual engagement rates. In fact, it is the second highest acquisition cost out of all user actions (i.e. install, register, etc.) for the Android platform, and the highest for the Apple platform. By classifying “subscribe” under the “freemium” umbrella, the argument is further grounded that acquisition costs are noticeably higher. This may dissuade companies from this structure if it runs too costly. For newer companies, such a method may be feasible since young businesses may not have the capital to pursue this option even if they desired. By coupling high acquisition costs with low conversion rates, which are difficult to optimize, this combination may not look favorable to companies.

According to Kumar, the approximate conversion rate for most “freemium” applications falls in a range between 2% and 5%. Through most of my research, I found that these conversion rates to be on the lower end of that spectrum. Ultimately, there is a silver lining between finding a balanced conversion rate, or one that is either too high or too low.

For instance, if a company has an average conversion rate of 1% for its mobile application, this may imply that the company may be too reliant on different forms of revenue for generating profits, such as advertising revenue. The greater issue though, may be that the application's free version might contain too many features.

One may ask why this is a problem; if there are too many features, there is no need for customers to purchase the premium version. This will impede on the company's ability to earn revenue. At the same time, a company may have too high of a conversion rate. Again, this may be indicative of a number of things. Though the company may be earning revenue from a larger number of customers, it mostly likely that the free offering is not as enticing at it should be. In this case, rather than hindering the firm's ability to generate revenue, a company may find it harder to grow its overall consumer base. Eloquently put, "you would do better to convert 5% of 2 million monthly visitors, for example, than to convert 50% of 100,000 visitors" (Kumar, 2014). Identifying the ideal rate is very difficult, but maintaining it may prove to be the more troublesome task. "Freemium" applications require consistent updates, not only to meet new consumer demands, but also to retain its current user base. This requires continual research and development (R&D), which significantly drives up a company's capital expenditure. Such financial scenarios and effects like these will covered in greater depth further in the thesis.

Consider the following image (Seave, "New Research Helps Find The Perfect Strategy For 'Freemium' Business Models", 2014):

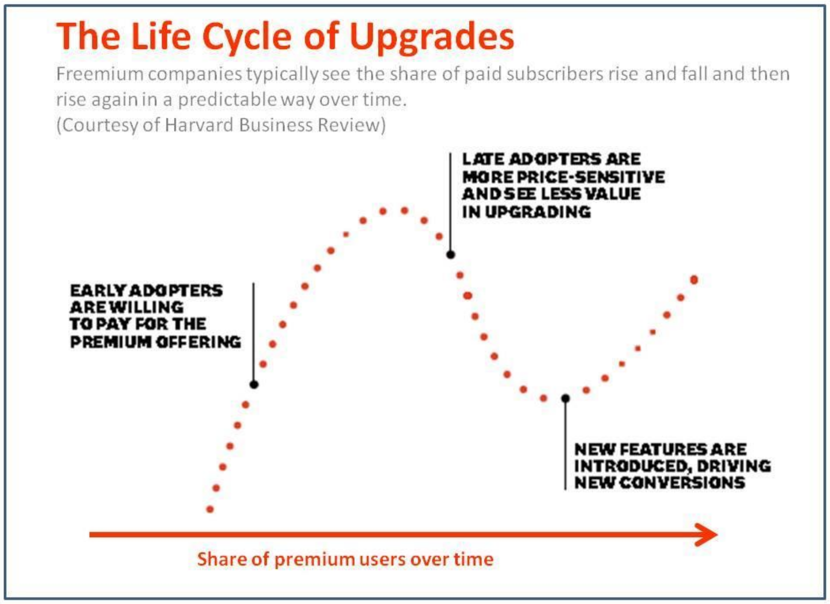

Figure 6: Number of paying customers of "freemium" offerings as time progresses

Most "freemium" companies may struggle in the "maturity" and "decline" stages of the product life cycle. Without any new offerings, companies can expect to see a decline in the amount of converted premium users, along with a complementary decline in revenue. Even if a company has determined the best conversion rate, it may still not generate an adequate revenue and profit unless a company has acquired a substantial number of customers. Any company which uses the traditional structure, but fails to draw customers finds itself in a catch-22 situation; it may continue to be unsuccessful with its current strategy, or switch to the "freemium" strategy and risk decreasing the number of paying customers it has.

Current Trends in the "Freemium" Application Industry

One of the most prevalent trends is that there is a shift in composition of the types of applications offered by genre. Consider the following visual (Richter, 2018):

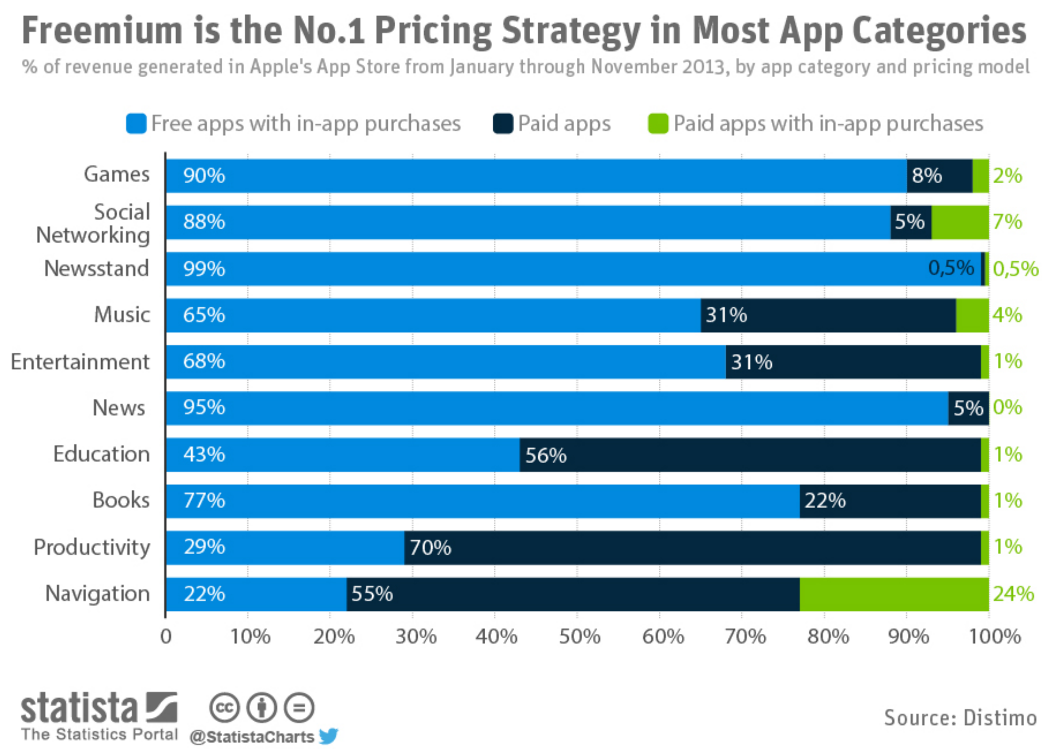

Figure 7: Breakdown of pricing strategy by application category

Within nearly all application categories presented, the predominant revenue generating model is the "freemium" strategy. In categories where "freemium" is less popular, it is likely possible that the pricing model is not effective. For instance, looking at the Navigation segment of applications, a "freemium" model may not work due to it being difficult to have both a free version and premium version of an application. Ultimately, the difference in value fails to be perceived by the customers. In these cases, companies would be better off directly offering a paid version of the application.

As a result of this shift towards the “freemium” payment model, we can also expect to see an increase in consumer spending on in-app purchases as more applications begin to offer premium offerings (CNET):

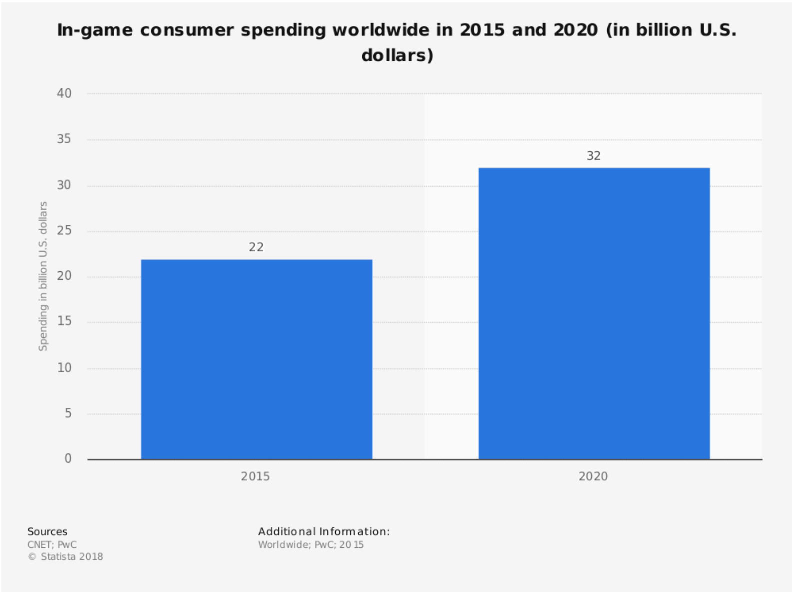

Figure 8: Worldwide In-game consumer spending in 2015 and 2020 (predicted)

Another interesting trend is that within the past few years, there has been a steady decrease in the conversion rate for mobile applications, regardless of whether the acquisition cost of a new customer is increasing or decreasing:

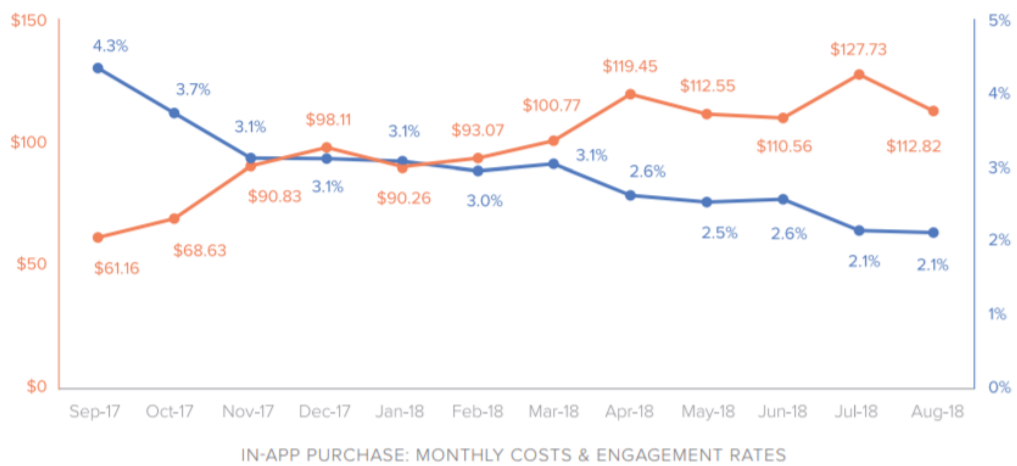

Figure 9: Acquisition costs and engagement rates between 2017 to 2018

Figure 9, taken from the 2018 Mobile App Engagement Index, shows that over the period of 12 months, engagement rates for applications fell to 2.1%, off of a high of 4.3% (as shown by the blue line). At the same time, the acquisition cost to gain a new customer nearly doubled (as shown by the orange line) (Mobile, 2018). There may be a number of reasons why we are seeing this phenomenon. The most likely, however, is that the value proposition for customers is not as satisfactory as it has been in the past. As a result, individuals have less motivation to become paying consumers for a given application. All in all, an issue like this cannot be simply solved by improving marketing or through more intensive advertising. It is also important to note the effects of seasonality within the data. During the months leading to, and including, the holidays, the acquisition costs and engagement rates are more ideal. Onwards, however, the numbers are not as favorable; we can see engagement rates fall as acquisition rates fluctuate, but primarily rise.

Lastly, one positive trend to observe is the growing success of “freemium” application, specifically within the gaming category. In the past year, 2018, “freemium” games have surpassed its “premium” competitors in total revenue generated. Consider the following (Tassi, 2019):

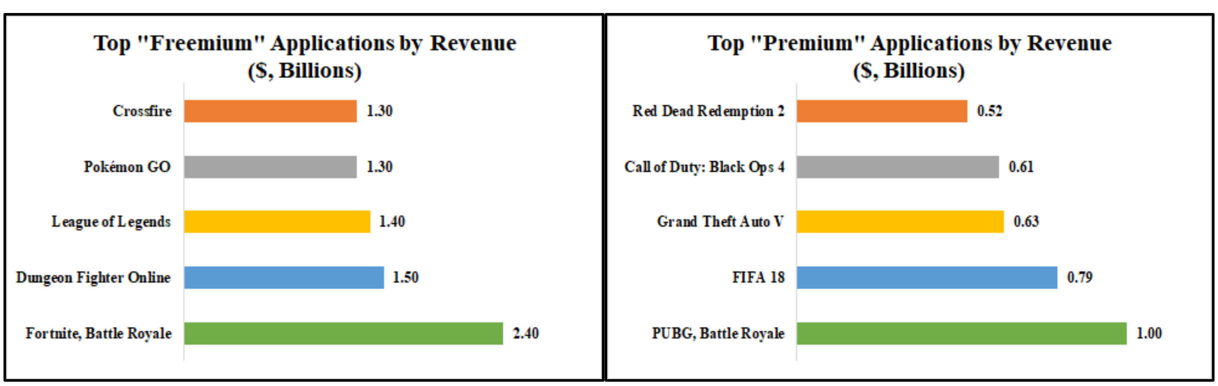

Figure 10: Top revenue grossing “freemium” and “premium” applications in 2018

The top grossing “freemium” game of 2018 was Fortnite, making $2.4 billion. This is significantly more than its “premium” competitor, PUBG, which only grossed approximately $1.0 billion this past year. More notably, though, is that the lowest generating “freemium” game, Crossfire, also made more than PUBG, the highest revenue generating “premium” game in the market by approximately $300 million. Again, this further validates the claim that “freemium” applications outperform their traditional equivalents, and provide more value to a company (in the form of revenue, in this case).

Within the gaming industry itself, the presence of mobile gaming is increasing, as is its contribution to video game revenue as a whole (Fortnite, 2018); this can be seen below:

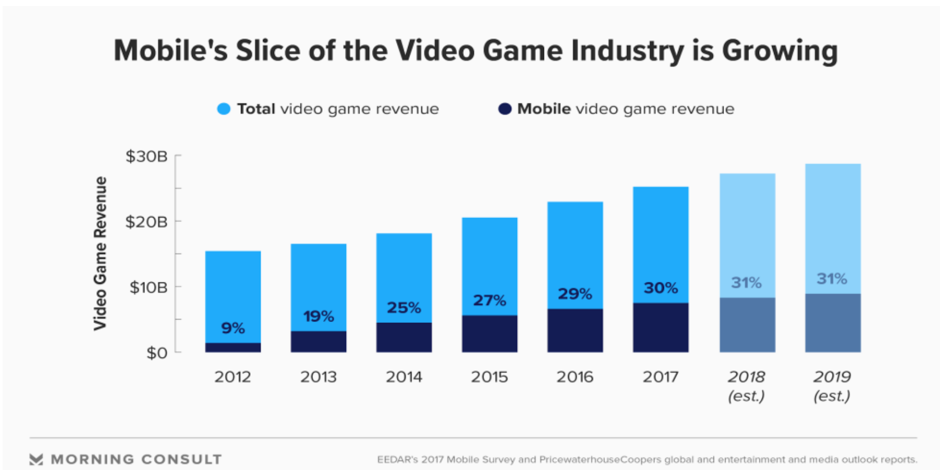

Figure 11: Revenue breakdown of video game revenue from 2012 to 2019

From 2012 to 2019, mobile games share of total video game revenue has grown from 9% to approximately 30%, nearly a 300% increase. Most attributable to this rise is the prevalence of “freemium” applications, which has not only increased the target market of consumers within the industry, but also provides a new source of revenue.

Company and Application Case Studies

Fortnite vs. PUBG

As mentioned previously, Fortnite outperforms PUBG when we consider pure revenue between the two games. There are a number of factors which enable Fortnite to be the more successful battle royale game available in the market. First, let us consider the scalability of the two games:

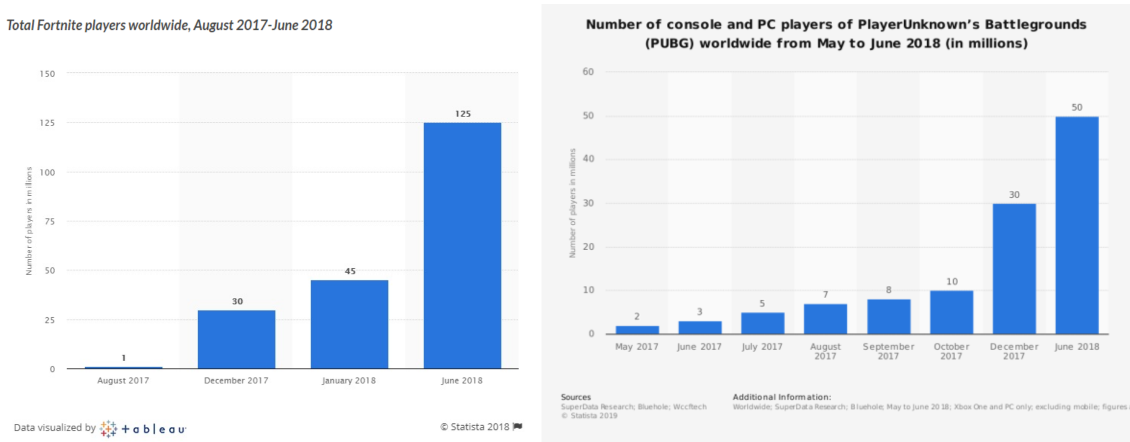

Figure 12: Total player bases of Fortnite and PUBG between 2017 and 2018

One of the key factors of Fortnite's success comes from its ability to grow its player base. During the game's first year of existence, its user base grew to 125 million players. As of March 2019, Fortnite accumulated 250 million players (Iqbal, 2019). This, of course, is all attainable through the nature of its "freemium" model; since the game was available for free when it came out, even currently, there was no cost for individuals to try the game. Conversely, PUBG employs a traditional "premium" model, and its player base grew at a remarkably slower rate. As of June, 2018, the game had 50 million active players, only equal to 40% of Fortnite's active player base. It is also important to note that since Fortnite is available for users to try for free, it may have taken some of PUBG's player base, as well as the segment of people who wanted to play PUBG, but didn't want to pay for it. As important as the total player base is, a more indicative metric of either application's financial success is its Average Revenue Per User (ARPU).

A 2018 survey conducted by LendEDU, a research firm, found that of 1,000 participants, on average, spent approximately $85 on in-game purchases offered within Fortnite. Individuals spent money on a variety of in-game aesthetics, such as outfits, emotes, and other characters. More generally speaking, however, approximately 70% of all players have made some sort of in-game purchase. Taking into account the non-paying players of the game, the APRU would be approximately $60 (Tassi, 2018). Though this is the equivalent of how much a traditional game would cost to purchase in store, Fortnite would not have reached its success had it chosen this route. Best put, “if Fortnite was sold as a $60 box copy per download, it would not have amassed anywhere near the [millions of] players it boasts today” (Tassi, 2018). The following shows a breakdown of how individuals spend within the game:

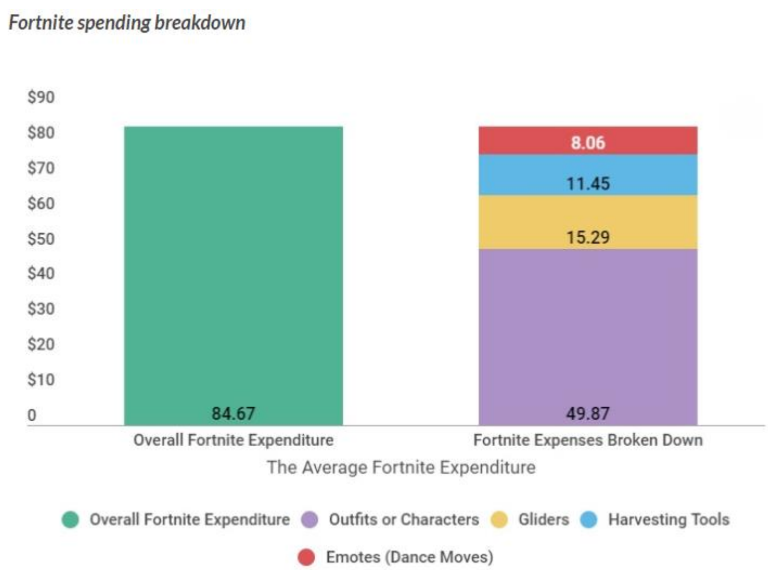

Figure 13: Breakdown of Fortnite in-game spending

Based on the data shown in Figure 13, we can infer that individuals do find value in Fortnite’s premium offerings, the aesthetic enhancements which players may purchase. Players find appeal and a motivation to make purchases through having different character decals and various themed costumes; these all classify as premium features which are not included in the basic, free version. Though many items can be acquired from just playing the game, there are various select items which can only be bought through the game’s store.

Consider PUBG, the game's primary source of revenue comes from the initial purchase of the game, currently at about $30. However, if we take into account that the mobile version of the game is free, the ARPU of PUBG is far less. Using the information mentioned previously, the game made approximately $1 billion dollars in 2018, with approximately 50 million players at that time. This means that the ARPU of PUBG is approximately $20, which is 33% of Fortnite's ARPU.

Fortnite is a great example of how a "freemium" model applied to a gaming application. Using the strategy, Epic Games is able to lure players in with the free game, then get them to spend just as much, if not more than they would have if the game was "full price" (Tassi, 2018). Now, let us take a look at other cases where the "freemium" strategy has been implemented, either successfully or not.

MailChimp

Mailchimp is an email marketing company; headquartered in Atlanta, Georgia. The company primarily caters to small and medium sized businesses, and provides email and marketing logistical services to its clients, enabling businesses to develop automated email services for internal and external applications (MailChimp). The company was founded in 2001, and it began under a "traditional" business model. Quickly after, the company realized that its performance was subpar; though the company was focused on earning money, its current customers were not generating a sustainable revenue. MailChimp's co-founder Ben Chestnut, explains, "For eight long years, we were focused on nothing but growing profits" (Robles, 2010). In 2009, the company decided to make the switch to the "freemium" model. The results quickly began to show.

Just one year after the company adopted the new structure, the company also increased its customer base by 150% and its profits by 650%. Prior to this, the company had struggled with attracting new customers and retaining them for an extended period. Now, “approximately 4,000 of the 30,000 new users MailChimp signs up every month are joining the ranks of the company’s paying customers” (Robles, 2010). In the years following the switch, the company’s profits have grown rapidly (Mailchimp):

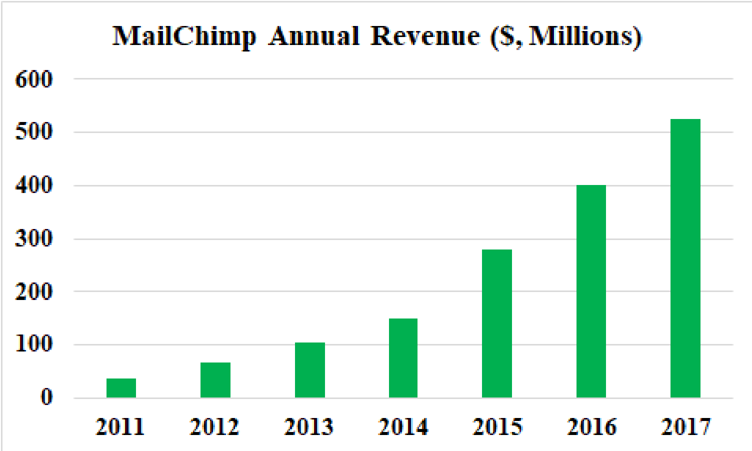

Figure 14: MailChimp annual revenue from 2011 to 2017

Between the period of 2011 to 2017, the company’s annual revenue grew at an average rate of approximately 57% each year. Chestnut attests, “we’re attracting larger users, with larger lists, and with more advanced needs” (Robles, 2010). The main reason for the company’s success is that prior to the “freemium structure,” the company had years to shape its offerings towards its customers. When the company ultimately transitioned to its new structure, “it knew how to sell. It had established the commercial viability of its product (because it had plenty of real customers), and consequently it therefore understood its value proposition to those customers” (Robles, 2010). This greatly benefitted the company as it transitioned to the new model.

Ning

Ning is an open source online platform which allows its users, whether it be single individuals or corporations, to design and create social media platforms and forums. Founded in

2004 in California, the company opted for a “freemium” structure to jumpstart its growth. Initially, the company was performing well, as it found potential in its ability to grow its user base, and maintain high traffic on its forum. At face value, Ning seemed to be setting itself up for great success, but when analyzing its financials, you find an antithetical story. Though the company aggressively raised over $100 million in venture capital funding, it had never posted a profit, and continually made losses each year (Keane, 2010). For Ning, the company’s free version proved too tempting for its users, who had no reason to upgrade and pay for a premium version. Compared to the free version, the premium option featured additional bandwidth and networking capabilities. In 2010, a new CEO joined the company, and took the company to a primarily traditional model. The year after the implementation of the traditional model, the company’s paid customer base expanded from 17,000 to 100,000 paying clients, an increase of almost 500%. In addition to that, year-over-year (YOY) revenue grew by over 500% (Mangalindan, 2011).

In this case, Ning had issues differentiating its free product offering from its premium options. As a result, customers were not convinced to upgrade, so the company was left with plenty of customers who were not generating revenue. Best put, “People don’t behave the way you think they might, so you’ll have to test everything” (Mangalindan, 2011). The truth is, though, that Ning could not have predicted whether the “freemium” model would have worked or not; it most cases, a company may have to experiment and see which result prove to be the most successful.

Conclusion

The "freemium" model puts a unique twist on customer engagement; draw customers in with tempting free content, and offer additional features for a price. Along with this, there are plenty of benefits that come about due to this type of structure; a company can grow its customer base quite rapidly since adopting, or trying out the product comes at no charge to the consumer. One downfall to this model, however, though is finding the proper silver lining between having an enticing free offering that doesn't offer too much or too little to customers. As was the case for Ning, its products did a great job to attract users, but failed to convert them into paying customers because they had no reason to upgrade.

Ultimately, the success, or lack thereof, depends on a firm's ability to judge its customers' value proposition. With Fortnite, the company's diverse, premium offerings prompt individuals to buy these aesthetic items, ultimately contributing to the majority of the firm's revenue. This has allowed the company to be more successful than its competitor, PUBG. Similarly, Evernote succeeds because the company constantly strives to widen the features available of its premium offerings, further incenting individuals to become paying customers. Not all companies, though, find success through the "freemium" model. Ning, for instance, struggled with the "freemium" model but succeed after switching to a traditional structure. The "freemium" model might just be a firm's opportunity to avoid failure, but if implemented incorrectly, may spell disaster.

Expanding Upon the Research

There are a variety of new studies and methods that can be done to further the research in this paper. For instance, measuring the amount of positive or negative externalities created by a company's choice to use the "freemium" model might give insight into how financially beneficial it is. Considering Epic Games' Fortnite application, research could be done to see its effect on streaming platforms, such as Twitch; in addition, an analysis on its impact on mobile device and computer sales, as well as GPU and CPU sales might also provide good indicators. Analyzing the reverse, any negative externalities, may help to illustrate more downfalls the model may have. This leads to whether or not we can expect overall expenses, or any specific ones, to be higher or lower for "freemium" applications versus the traditional equivalent?

Lastly, more analysis should be conducted on public companies, as their information is more readily available. Many of the companies discussed in this paper are private companies, meaning that company information was sparse. This set a constraint on the span at which the firms and their respective applications could be analyzed within this essay. Certain metrics, such as analyzing a company's free cash flow and other key financial ratios were unfeasible because the required data for those calculations was not accessible.

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